Description and outcomes of the DoctorQuality incident reporting system used at Baylor Medical Center at Grapevine

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Problem: To improve error reporting so as to increase patient safety in a health care environment in which many barriers to reporting exist.
Setting: Baylor Medical Center at Grapevine, a 104-bed hospital in Northeast Tarrant County that is part of the Baylor Health Care System.
Strategies for improvement: Partnering with DoctorQuality to provide a consolidated, Web-based form for error reporting, online education, and a risk analyzer, complemented by efforts toward cultural change including staff training, encouragement of feedback, and the use of financial and nonfinancial incentives to report errors.
Effects of change: After implementing the system, the number of events reported increased 250% to 500%; costs for data collection, analysis, and management decreased by $25,000 to $35,000 annually; and the time required to track errors and make improvements was reduced 25% to 50%. Further, managers and staff were very satisfied with the system, ranking it >4 on a 5-point scale.
Conclusion: The institution's partnership with DoctorQuality to create a single Web-based form for error reporting was successful in improving efficiency and ease of access in reporting. Further, the institution was successful in creating a new organizational culture around errors. The success was due in part to strong leadership, collaboration of multidisciplinary staff, the ease of use of the system itself, and the effective educational, motivational, and communication mechanisms used.

Despite the focus on patient safety resulting from the Institute of Medicine's 1999 report, *To Err is Human*, the actual reporting of adverse errors or near misses is often overlooked in health care institutions. Few institutions have a systematic program that records, tracks, and monitors adverse events efficiently and effectively and thus measures the safety environment.

In an October 2000 survey that asked 644 health care professionals why they didn't report errors, >90% cited loss of reputation, 90% cited the fear of losing their jobs, and >80% cited loss of market share, loss of accreditation, fear of punishment, and liability concerns (1).

Another reason is lack of leadership. Many leaders think it is enough to tell managers to be safe. Unfortunately, many institutions wait until tragedy strikes before they tackle issues of patient safety.

Lack of a common understanding about errors among health care professionals is another barrier to adequate reporting. As indicated by the survey responses mentioned above, most professionals still think of errors as individual. In reality, errors are a systems issue and not solely a human issue (2). Further, previous theories led many to believe that an error was something that resulted in patient morbidity or mortality and was committed by one of the few health care professionals involved in the care of the patient. Today, we embrace a broader definition of error, one that includes mistakes that do not cause patient morbidity and that involve all employees in the health care system, even those who never see the patient.

The manual systems for error reporting currently used in some hospitals are often ineffective. Staff are confused about which of many forms to use, where to send forms, and who is responsible for follow-up. In addition, paper seems to flow slowly from desk to desk, with multiple opportunities to be misplaced.

This article reviews the efforts of Baylor Medical Center at Grapevine, which has 962 employees and 104 beds, to address the problem of underreporting of errors. The institution partnered with DoctorQuality to create a Web-based form for efficiency and ease of access and supported this effort with the necessary communication to create a new organizational culture around errors (3).

METHODS

In February 2000, leaders at Baylor Medical Center at Grapevine began working with DoctorQuality to consolidate multiple incident-type reporting forms (such as occupational health, medication, security, and patient/visitor incident) into one form through the use of a Web-based system customized specifically to its environment. They listed the following goals for implementation success:

Organizational goals:

- To demonstrate strong leadership by having leaders make a meaningful commitment to quality and patient safety through direct involvement, resource support, and removal of barriers
- To complete an organizational self-assessment to identify areas that need improvement

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- To provide financial and nonfinancial incentives for error reporting
- To provide feedback regarding patient safety data, i.e., what is being done with the information
- To stop debating the definitions of errors and try changes
- To create an open-book data environment, decentralizing the function of risk management
- To define success based upon effective execution
- To create a culture of change and urgency
- To comply with various external regulatory guidelines and standards
- To foster culture change regarding patient occurrence reporting

Reporting system goals:

- To provide a simple, easy-to-use reporting system, eliminating paper reporting
- To use simple measures of success such as increased error reporting and reduced time to resolution and then gradually build upon those measures
- To create a secure, confidential, and accurate report of any unusual, unanticipated, or unexpected patient occurrences, thus allowing for national benchmarking opportunities
- To provide online training that would be available to staff anytime
- To provide online help for the end user, fostering a more complete report that improves data quality
- To provide secure access of data to selected individuals based on their roles and areas of responsibility
- To create a risk stratification model with an associated alert mechanism, similar to that used for the medication scale
- To make individual and composite data available to administrators and managers on a real-time basis via the intranet

Development of the Web form

In March and April 2000, the form and system were refined, management and staff underwent training, and an organizational self-assessment was completed to better understand the cultural and environmental issues that surround error reporting.

The risk prevention and management system, called Medical Error Tracking System, was launched at Baylor Medical Center at Grapevine and Baylor Medical Center at Garland in August 2000. The reporting form appears as *Figure 1*. To enhance completeness and accuracy of the data, drop-down fields were built into the system to probe staff responses. The Web-based reporting system allows select leaders access to aggregate data and the ability to analyze data by any field within the database and modify reports. Instant messaging can be accomplished through the e-mail system by using a ticket number reference. Technological features of the system are summarized in the *Table*.

Rollout and updated capabilities of the system

After the launch, feedback was ongoing. Baylor Medical Center at Grapevine communicated with DoctorQuality weekly through conference calls involving all key stakeholders, and DoctorQuality responded by addressing problems, making improvements, fine-tuning the system, and training managers and staff on new features.

Table. Technological features of the risk prevention and management system used by Baylor Medical Center at Grapevine

- **Access:** through the Internet from any workstation
- **Hosting services:** provided by DoctorQuality, with servers maintained 24 hours a day, 7 days a week by technical personnel
- **Platform:** Microsoft 2000 using Microsoft's most advanced Internet information server (Microsoft IIS) and the Microsoft SQL 2000 database
- **Programming languages:** com and ASP
- **Security:** Secured sockets layer; digital certificates assigned by Verisign; password protection and encrypted data transmission; 2 layers of firewall protection for hardware and software systems
- **Analysis:** real-time risk analysis of collected data by designated managers; graphical and tabular data analysis; standard and user-controlled ad hoc query and reporting
- **Modifications:** option for "super users" to make changes to the system easily

Baylor Medical Center at Grapevine is currently expanding this product by working with DoctorQuality to capture patient satisfaction data that can be linked with occurrence reports. The Web-based form for patient satisfaction is very similar to that for error reporting and will require minimal additional staff training.

DoctorQuality also offers the ability to make the error reporting mechanism available online through the Baylor Health Care System Web page. This feature is of interest to our community and board of trustees and is being evaluated for future implementation.

Education and cultural changes

Baylor Medical Center at Grapevine initiated a culture change about error reporting through its "I Plant Flags" campaign. Staff were taught that an occurrence is like a pothole, and walking around it is a near miss. Whether one "falls in" or "walks around" a pothole, a flag should be planted to alert the "pothole fixers."

The first component of the campaign was education about error reporting and the Web-based system, which included a combination of just-in-time training, formal training, education sessions, and ongoing updates and notices of change. Training was also integrated into manager training and new employee orientation.

The second component was communication: Baylor Medical Center at Grapevine used numerous media and vehicles to communicate and provided timely, ongoing feedback to all staff and managers on specific event follow-up as well as aggregate data.

Finally, the rewards and recognition system incorporated error reporting. Individuals and teams that reported more events than others received free lunches and movie coupons. In addition, "I Plant Flags" buttons and other forms of visible recognition were used to acknowledge individuals and departments that invested in reporting, following up, learning from adverse events, and making improvements.

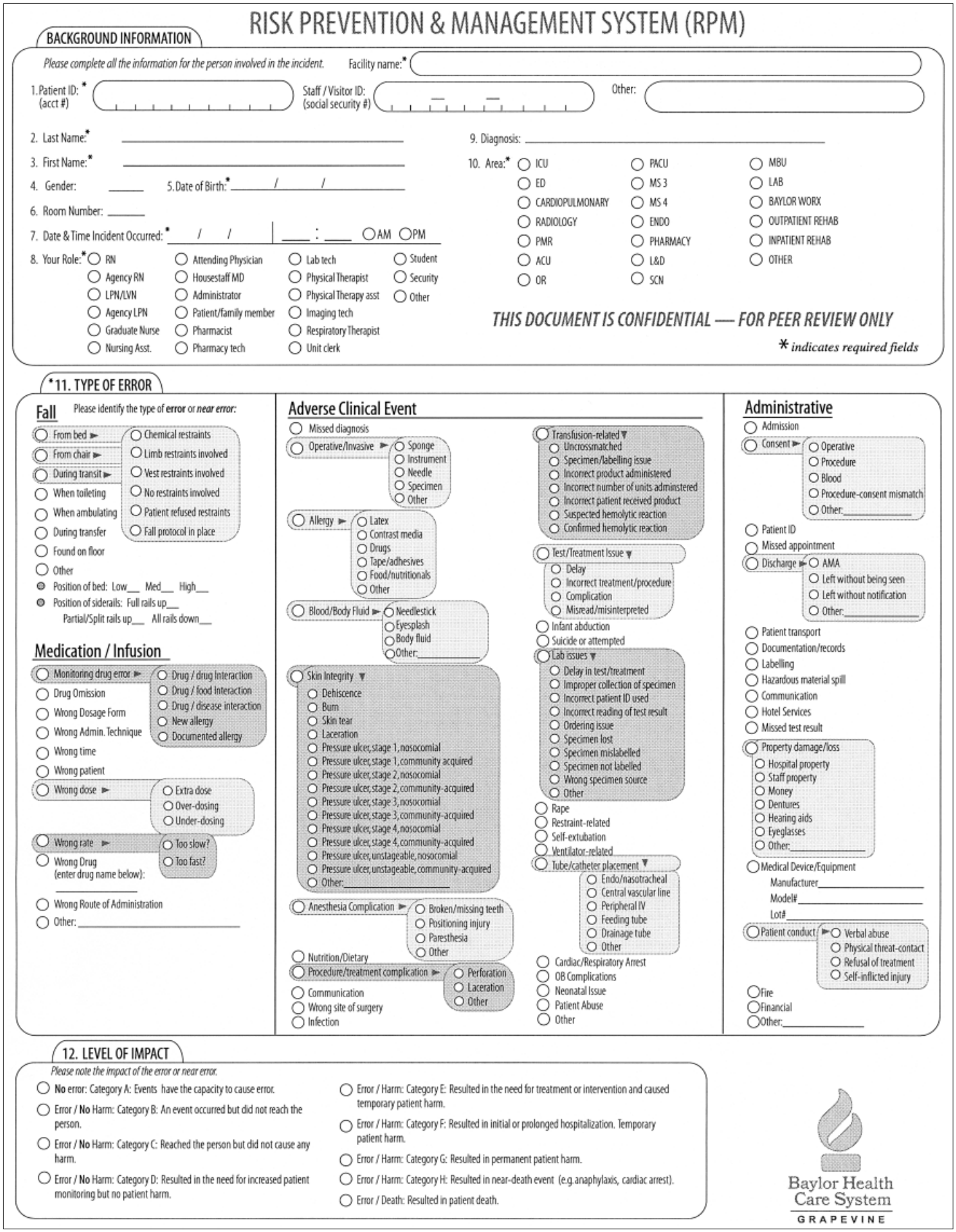

Figure 1. The Web-based incident reporting form used at Baylor Medical Center at Grapevine.

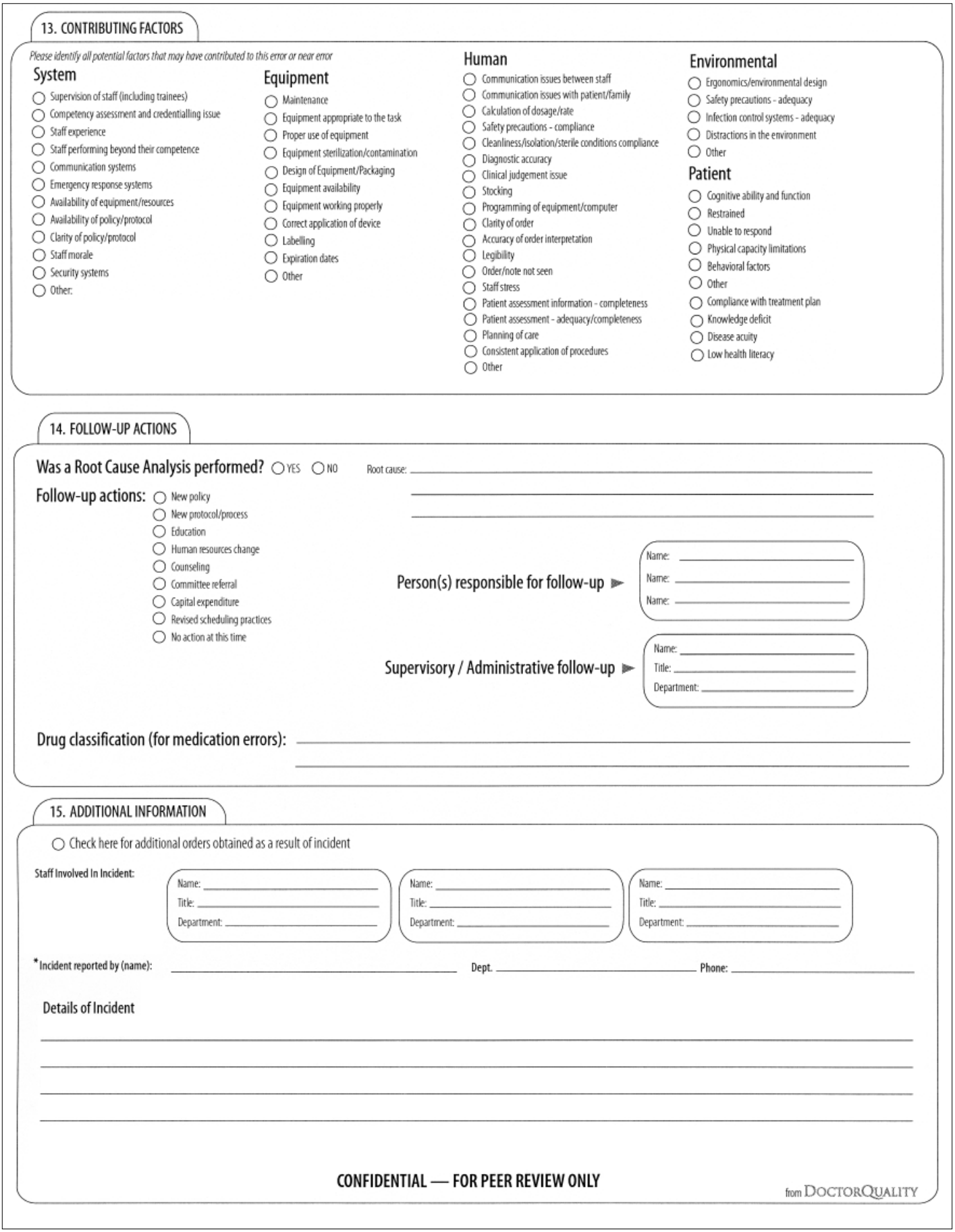

Figure 1, continued. The Web-based incident reporting form used at Baylor Medical Center at Grapevine.

Measurement

In December 2000, 3 months after the launch, Baylor Medical Center at Grapevine evaluated the success of the pilot through satisfaction surveys of staff and site managers, as well as measurement of the number of errors reported and documentation of process improvement. Staff at Baylor Medical Center at Grapevine continued to track the number of errors reported. Costs and response time were also evaluated.

RESULTS

All site managers were surveyed during a management team meeting, with a 100% response rate. All staff were surveyed during training, again with a 100% response rate. Both the managers and the general staff group indicated that they were highly satisfied with the system, rating it >4 on a 5-point scale. Satisfaction was also related to the replacement of 5 forms with a single form, eliminating confusion about which form to use.

With the use of the system, the number of events reported increased 250% to 500% *(Figure 2)*, resulting in quality data and proactive risk management practices.

Costs for data collection, analysis, and management decreased by $25,000 to $35,000 annually (the equivalent of a 0.5 to 0.75 full-time equivalent for a mid-sized community hospital). Additionally, since this was a pilot project, there was no cost to the organization from DoctorQuality. Continued use costs only $7000 a year, with no internal information systems support required.

The time required to track errors and make improvements was reduced 25% to 50% by eliminating the passing of paper and making reports immediately available to site managers online. Follow-up and follow-through were immediate.

DISCUSSION

With strong leadership, an easy-to-use reporting system, incentives for reporting, feedback about data and changes, and one automated system for reporting all occurrences, safety management has became part of the daily routine at Baylor Medical Center at Grapevine. The system makes it simple for staff to access error reporting anywhere in the organization.

Implementing Web-based technology for error reporting not only helps streamline the risk identification and data management process and allow more time for the design and implementation of improvement initiatives, but it also provides the ability to collect, store, and analyze a large volume of data in a secure environment in real time. In addition, it offers internal and national benchmarking opportunities.

By partnering with DoctorQuality, Baylor Medical Center at Grapevine has an important tool in analysis of data: benchmarking statistics collected by its partner. DoctorQuality provides regular reports that give aggregate statistics on its clients' error reporting, including who is reporting and when, types of events being reported, level of impact of events reported (from near miss to permanent harm or death), and possible contributing factors (4).

Among other benefits of the Web-based system are complete anonymity while reporting, the availability of online education and resources, secure hosting of the data, and the ability to securely and seamlessly contribute data to national, regional, or state-level databases. Finally, the system was already compliant with the Health Insurance Portability and Accountability Act, eliminating the need for resources devoted to assessing compliance.

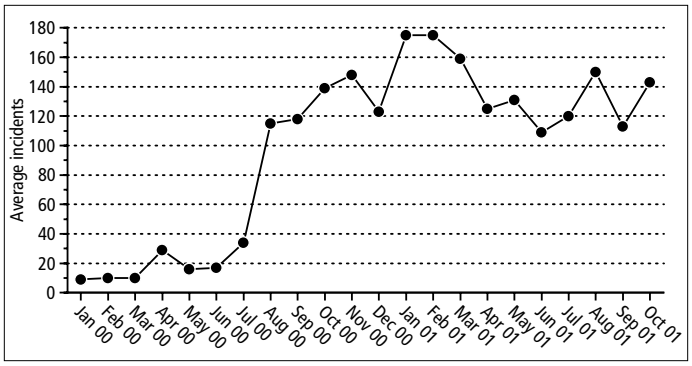

Figure 2. The number of incidents reported before and after implementation of the Web-based risk prevention and management system at Baylor Medical Center at Grapevine.

Based on its goals and the outcome measures examined, Baylor Medical Center at Grapevine considers its system a success. Several factors contributed to this success:

- Its leaders were committed to Baylor Health Care System's mission of becoming the most trusted source of comprehensive health services—providing high-quality, safe patient care that can be measured and reported.
- The staff, department managers, physicians, and administrators supported the project and worked together on it. Physicians in particular were educated about systems and processes and bought into the project.
- The educational style of "training the trainer" with integrated and ongoing education proved to be highly beneficial. As part of the education, case studies of hospital system successes and failures in error reporting were effective and eye-opening.
- The "I Plant Flags" campaign, with its continuous communication with the hospital staff through newsletters and department meetings, was effective.
- The employee rewards that were implemented worked well. The rewards included formal and informal recognition (i.e., "I Plant Flags" buttons, food coupons, monetary awards, and team awards).
- The decentralized management style opened the lines of communication, removed the fear of blame and punitive measures, and helped to enhance error reporting. It also made it easier for the individual or manager to be accountable for following up on error reports (5).
- A simple and easy-to-use reporting system was an obvious key to success.
- Feedback from the patient safety data made it easier to identify gaps in care and implement improvement initiatives.

It is important to note that additional reports are valuable only if safety opportunities are mined from that data. For example, over the last year multiple improvements have been made to the falls program. The automated tracking system prompts the reporting individual to provide more specific data. Initially we recognized that the falls program was isolated to the medical-surgical floor, and lack of information resulted in a fall in the radiology department. The falls program was rolled out to the

entire facility and included new methods for identifying those patients assessed as having a high risk for falls. Additional data revealed specific improvement opportunities in almost every department as increased recognition of the falls program developed throughout the hospital. Monthly reports spark discussion and data analysis as opportunities continue to be evaluated. This concentration has resulted in a 44% decrease in inpatient falls hospitalwide.

From an information technology perspective, the reporting of medical errors will clearly continue to be a major component of patient safety. Being able to link satisfaction, quality, and safety completes the picture of the patient's experience in our organization. The addition of the Web-based satisfaction reporting system is another way to continue to meet the goals of Baylor Medical Center at Grapevine.

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